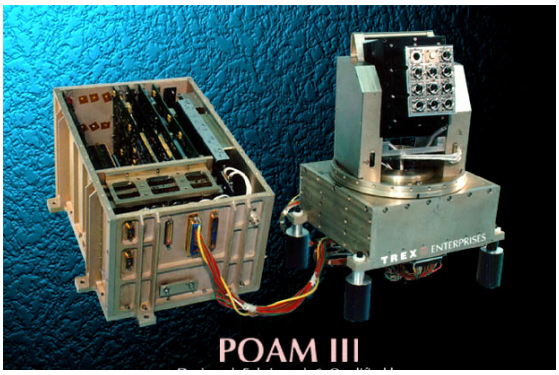
Polar Ozone and Aerosol Measurement (POAM III)

The NRL POAM III instrument is a satellite-based, nine-channel, visible/near infrared photometer for making measurements of important constituents of the stratosphere and upper troposphere using the solar occultation technique. The following table gives the POAM III measurement complement and altitude ranges:

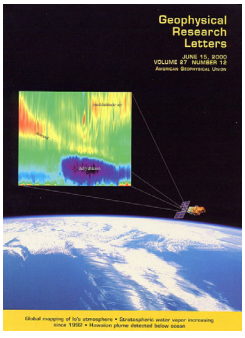
Ozone:	8-60 km
Aerosol Extinction:	10-30 km
Nitrogen Dioxide:	20-40 km
Water Vapor:	8-45 km



POAM III was launched on the French SPOT 4 spacecraft on March 23, 1998 (into a polar, sun-synchronous orbit), and is still operational. POAM III is the successor the NRL POAM II instrument, which operated from October, 1993-November, 1996. The POAM III orbit is such that measurements are obtained in the polar regions of both hemispheres on a continuous basis. The original scientific objective of the POAM experiments was to characterize atmospheric propagation at laser wavelengths over the poles. An additional scientific emphasis on stratospheric ozone research was added by NRL. Indeed, both the POAM measurement complement and measurement range make the instrument ideal for studying polar ozone depletion processes.

The POAM program has been very successful, and it has become an important national scientific asset for stratospheric ozone research. A small sampling of the many scientific accomplishments of the POAM program is given below:

- POAM has documented, in unprecedented detail, the ozone depletion occurring in the Antarctic ozone hole. The unique POAM climatology of the ozone hole now spans seven seasons. Furthermore, POAM is the only instrument currently maintaining a climatology of polar stratospheric clouds (PSCs) (a critical ingredient in the formation of the ozone hole).
- POAM has made the first detailed satellite measurements of the evolution of dehydration of the Antarctic stratosphere, which occurs as a result of the subsidence of water ice PSC particles. This work was featured on the cover of *Geophysical Research Letters*.
- POAM measurements have been used to infer and quantify ozone depletion in the Arctic, which occurs during cold Arctic winters.



- The POAM measurements have led directly to the important new scientific discovery that boreal forest fire smoke is injected into the stratosphere via intense convection in thunderstorms.
- To date, POAM measurements have resulted in 49 papers published in refereed scientific journals, and more than 120 presentations at scientific meetings.

The Office of Naval Research (ONR) funded POAM III instrument development and fabrication. The launch was supported by the Defense Department's Space Test Program (STP) and continuing mission operations, data acquisition and processing costs are provided by ONR/NRL and NASA (through the NASA Data Buy program).

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